

UNITED STATES DEPARTMENT OF AGRICULTURE
SCIENCE AND EDUCATION ADMINISTRATION

AGRICULTURAL RESEARCH
SOUTHERN REGION
Screwworm Research
P. O. Box 986
Mission, Texas 78572

April 24, 1980

Subject: Current Staff and Budget Situation at the
Screwworm Research Units - Mission, Texas and
Tuxtla Gutierrez, Mexico

To: E. A. Taylor
Area Director
Weslaco, Texas

During the past several months many changes have occurred within our group, some of which I feel are cause for considerable concern. We now have 3-4 key positions vacant, the cost of doing research has increased and overall available operating funds have decreased. I feel it is time we document these problems so that as soon as possible we can take the necessary courses of action to correct them.

At the present time our most urgent need, in terms of new staff, is a research leader at Tuxtla Gutierrez. We have 2 excellent young scientists (John Spencer, James Mackley) at Tuxtla who are doing a very good job, however, I feel their research contributions could be significantly increased if a senior scientist could be transferred to that location to provide research leadership and assist with program planning and coordination. In addition, such an individual could also free the 2 scientists there from much of the administrative details that they are now handling and give them more time to spend in the field.

For the past several months the leadership for the Tuxtla laboratory has been provided from Mission by the Research Leader or Acting Research Leader. For a short period this is a workable situation, however the distance between the two units and the relatively poor communication systems in Mexico makes this a poor arrangement for long term operations.

When I assumed the duties as the Acting Research Leader at Mission in December it was my understanding that O. H. (Hugh) Graham would be transferring to Mission within a month, and

within 2-3 months he would transfer to Tuxtla and would serve as research leader there until his retirement (approximately 2 years). So far this transfer has not taken place. In a recent letter, Dr. Ed Kendrick indicated this transfer will not take place until Hugh has completed his work on a book he is writing. This could require several more months or years depending on the degree of completion that is required. Equally important, Dr. Kendrick has indicated that Dr. Graham's salary and support money would remain at Kerrville. Recently, I have learned that we will apparently lose Dr. Snow's and Dr. Brown's salary-lapse money, and in view of these developments we cannot afford to pay Dr. Graham's salary this fiscal year. These budgetary problems could be overcome if Hugh could come with his salary at least to October 1, 1980. If we try to support Dr. Graham under the current situation we will have to terminate some of our ongoing research projects to cover his salary; a move I believe would not be in the best interest of this program.

Recently, per your request, Dr. Harold Brown was transferred to Weslaco to assume the duties of Research Leader for the Food Crops Utilization Unit. Considering that Harold did not wish to transfer to Mexico and the need for a research leader at the utilization lab, I feel this was a good move for both Harold and SEA; however, this created another vacancy in a key position at our location, that of a research chemist.

Dr. Brown has agreed to work part-time with us to help keep some of our planned projects going, however, this is only a short term solution. If we are to maintain the quality of quantity of research we have in the past with swormlure, SWASS, bait stations, insect nutrition, isoenzymes, cuticular hydrocarbons, flower attractants, etc., we need a full-time chemist. I feel it is extremely important that Dr. Brown be replaced as soon as possible by another research chemist who will agree to transfer to Mexico when this laboratory closes. This will provide good chemistry support now and will help assure continuity in our research program over the next several years.

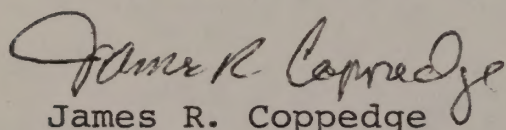
Since John Goodenough's transfer last summer we have been without the services of an agricultural engineer. His expertise in insect vision analysis, insect sound analysis, trap design, special equipment design, etc., has been sorely missed. Again, I think the research program here could be

significantly strengthened if Dr. Goodenough's position could be filled, especially if we could find someone willing to eventually transfer to Mexico.

In the past, we have felt that for the Tuxtla laboratory to be adequately staffed with professional people we would need at least 5 research entomologists (including the RL), 1 research chemist and 1 research agricultural engineer. As indicated previously, we currently have only 2 research entomologists at Tuxtla.

Dr. Richard Peterson, research entomologist, who is now located at Mission is scheduled to transfer to Tuxtla within the next year. In addition, Mr. Harold Tannahill, biological technician (GS-7), who is also now at Mission has indicated a willingness to transfer to Tuxtla if we can change his classification to a GS-9/11 entomologist (this action has been initiated). If Mr. Tannahill transfers to Tuxtla we will then be short 1 entomologist, 1 chemist, and 1 agricultural engineer. If Hugh Graham transfers to Tuxtla and we fill the chemist and agricultural engineering slots with people willing to transfer to Mexico, we will be in good shape. The chemist and agricultural engineer positions should be filled as soon as possible as it would be highly desirable if these individuals could have 1-2 years training in screwworm research at Mission before transferring to Mexico.

Until the last 2 years the budget for the screwworm research unit has been adequate, especially since we received additional funding from time to time to support special projects. Recently, we have found it harder and harder to provide the needed research support for the screwworm eradication program with our allotted operating funds. There are several reasons for the increased operating costs, namely, (1) inflation, (2) expansion of the facilities at Tuxtla and (3) the necessity of doing most if not all of our large scale field testing in Mexico (a recent 3 month research project in Sinaloa cost us over \$100,000). If we were fully staffed right now we would have a very difficult time operating with our allotted funds. I firmly believe that if we are to continue to support the eradication program as we have in the past we need to increase our current funding by \$300,000 - \$400,000 per year.


James R. Coppedge
Research Leader

cc: E. L. Kendrick, RA, New Orleans
D. A. Lindquist, NPS, Beltsville
H. E. Brown, RL, Weslaco
John Spencer, Res. Ent., Tuxtla
O. H. Graham, Ent., Kerrville

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Date: 22 August 1980

A Screwworm Eradication Program for Central America: Preliminary Feasibility Study

Note:

Screwworm Eradication Records

Screwworm Eradication Collection

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UNITED STATES DEPARTMENT OF AGRICULTURE
SCIENCE AND EDUCATION, ADMINISTRATION

AGRICULTURAL RESEARCH
SOUTHERN REGION
Screwworm Research
P. O. Box 986
Mission, Texas 78572

August 22, 1980

Subject: A Screwworm Eradication Program for Central America:
Preliminary Feasibility Study

To: James R. Coppedge, Research Leader
USDA, SEA, AR, Screwworm Research
P. O. Box 986
Mission, Texas 78572

During 1980, the Interamerican Institute of Agricultural Sciences, an agency of the Organization of American States, has intensified its interest in the improvement of national and international animal health programs in the Americas and, as an aspect of that interest, Dr. F. J. Mulhern, Director of Animal Health for IICA, has inquired about the technical feasibility of extending the Mexican-American Screwworm Eradication Program through Central America to the eastern boundary of Panama. As the first phase of a technical feasibility study Dr. Mulhern recently arranged for a team of experts (see Annex A) to visit the seven countries of Central America and interview knowledgeable government officials and livestock producers in each country. Except for El Salvador, which Dr. D. L. Williams visited on August 12, all of the countries were visited during the period July 28 to August 8, 1980 (a livestock census is presented in Annex B). This report defines in a preliminary way the research which should be completed before final plans for a Central American program are approved.

At the meetings held in each of the countries, Dr. Robert S. Sharman, the team leader, briefly explained how screwworm eradication was achieved in Curacao, Puerto Rico and the United States and the progress of the program in Mexico. The technology of the program was introduced by presenting an excellent 15-minute movie which was made in Mexico. With this information as a background, people in the audience often asked questions (for example, will a rearing plant be operated in our country?) and we then began to ask questions about the incidence of screwworms in that country, variations in screwworm populations by regions and by seasons, economic losses, livestock management systems, the treatment of screwworm infestations, the registration of insecticides and restrictions on the use of insecticides within the country, the availability of aircraft and the

restrictions on their use, the role of wild animals as screwworm hosts, and the incidence of other parasites and their importance in comparison with screwworms. Since SWASS is not mentioned in the movie, Dr. Sharman usually briefly explained how it has been used to supplement the release of sterile flies. Dr. A. A. Arce of the Interamerican Development Bank often discussed regional and national programs of animal health, how their infrastructure may be strengthened, and methods that have been used to finance such programs.

In all of the countries we encountered active interest in screwworm eradication. There are many important animal health problems in Central America, but screwworm infestation is one of the most urgent in that screwworms rapidly kill their host if neglected and in many regions producers must inspect their livestock daily and treat all wounds without delay. The navels of new-born calves are customarily treated on the day of birth and the ranchers we questioned all replied that 10 of 10 calves would be screwworm-infested within 2 days if left untreated. Under their labor-intensive management system screwworm death losses are quite low, and it appears that in Central America, domestic animals are less important in maintaining screwworm populations than they were in the United States and northern Mexico prior to 1962.

Conclusions: (1) In our preliminary study, no technical barriers were found which would prevent the eradication of screwworms from Central America if the techniques of the Mexican-American program are utilized in an efficient manner and the lessons learned from that program are heeded; (2) in theory a Central American eradication program should be concluded rapidly, perhaps as quickly as the Florida program, because (a) Mexico is about four times larger than Central America, (b) the relative narrowness of the Isthmus, 50 to 300 miles and usually about 100 miles from ocean to ocean, would make it possible to move steadily forward with minimum concern for the flanks of the eradication area, (c) seasonal fluctuations in a tropical area may be less violent than have been seen in the U.S. and northern Mexico and it may not be necessary to cope with outbreak situations, (d) if the program moves rapidly established ranch practices will minimize the number of screwworms which develop in domestic animals, and (e) SWASS, either the present or an improved version, can apparently be used with minimum restriction in all of the countries to reduce the wild fly population before sterile flies are dropped; (3) a Central American program could be undertaken in three phases if such an approach was suggested by economic or political considerations; these phases being, (a) Belize and Guatemala, (b) El Salvador, Honduras and Nicaragua, (c) Costa Rica and Panama; (4) screwworms are present in all of the countries and are a constant threat to livestock second in importance as ectoparasites only to the torsalo (*Dermatobia hominis*) and cattle fever ticks; (5) the eradication of screwworms would reduce the cost of livestock production by reducing

expenditures for labor and insecticides; (6) probably new areas in some of the countries can be used for cattle raising if the screwworm is eradicated; (7) the governmental infrastructure for animal health in some of the countries would be strengthened during the course of a successful screwworm eradication program; (8) international and regional coordination and cooperation would also be improved during a successful program; and (9) three drastically different ecological zones (within each of which a different screwworm situation can be anticipated) are found in all of the countries except Belize and El Salvador - (a) the Pacific coast with a well defined dry season from January until May and about 1200 to 2000 mm. annual rainfall, (b) the Altiplano or central highlands, relatively cool, moist zones with coffee, pines, dairy cattle and a high incidence of torsalo, and (c) the Atlantic coast with a poorly defined dry season and 4000 mm. or more annual rainfall.

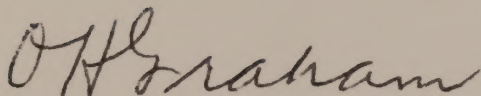
Recommendations: (1) If IICA or any other international organization is seriously interested in eradicating screwworms from Central America, an entomological survey of the screwworm should be undertaken in a few representative areas. This survey was discussed by the team as "a 60-day survey", but probably could not be completed in that period of time. The objectives of the survey would be, (a) to estimate the abundance of wild screwworm flies by trapping them in wind-oriented traps, (b) to accumulate information on the incidence of natural screwworm infestations in domestic animals, (c) to observe the frequency of egg mass deposition on artificial wounds such as castrations, peeling brands or wounds in sheep, (d) to characterize the isoenzyme patterns, chromosomes characteristics and morphological characteristics of the male genitalia of 3 to 10 Central American populations, (e) to observe laboratory mating behavior of those populations when crossed with each other and with Mexican populations, and (f) to collect any information which is readily available about the incidence of screwworm infestations in wild animals. (2) At least one professional scientist in each country should be invited to participate in a training course in screwworm eradication technology which would be conducted by APHIS, SEA and the Mexican-American Commission at Mission, Guadalajara, and Tuxtla Gutierrez. (3) An understanding should be negotiated with each of the countries to the effect that the trained scientist would be able to function as a counterpart to representatives of any international group working on screwworms in his country and cooperate in the conduct of scientific studies. At least one year before eradication activities begin in any country, a system of larval sample collection should be established in that country to determine the species which cause myiasis and their comparative incidence. Simultaneously an educational program should be initiated which would include modern wound treatment techniques. (4) In at least a preliminary test it should be determined that SWASS as now used in the U.S. and Mexico will function in representative locations in Central America or that SWASS needs modification for Central America.

(5) To save time and money the preliminary studies should be limited to three areas. The following are representative of the ecological zones of Central America and have networks of roads, other communication facilities, political stability and other advantages that would make it possible to carry out surveys in an efficient manner:

- (a) Belize, northernmost of the Atlantic coast zones, and one of the first areas to enter eradication,
- (b) Turrialba, Costa Rica, typical of the Altiplano of Central America,
- (c) Guanacaste Province, Costa Rica, typical of the best beef cattle production in Central America and of the Pacific coasts of Guatemala, Nicaragua, Costa Rica and Panama.

(6) In at least a preliminary way it should be determined whether or not other species of Calliphoridae and Sarcophagidae found in Central America are capable of initiating myiasis in the same way that the screwworm does. Species of *Cochliomyia* other than *hominivorax* and *macellaria* can be expected to occur in Central America, but not necessarily as parasites of domestic animals. (7) If serious interest in a Central American eradication program develops and if it is determined that SEA will support such a program, a semi-permanent laboratory should be established in Turrialba, Costa Rica or some other location in Costa Rica or Panama. In addition to continuing the entomological studies in screwworm biology, ecology, and genetics already mentioned, this group would have the following objectives:

- (a) to study the population dynamics and natural enemies of screwworms in the wet tropics from the viewpoint of the influence of pathogens, parasites, predators and other biological control mechanisms on native screwworms and the potential effect of those mechanisms on colonized screwworms and released sterile flies,
- (b) to study the special problem of the Mosquito Coasts of Honduras and Nicaragua (this large, swampy region, for the most part unsettled and undeveloped, could be a barrier to screwworm eradication in that it will be very difficult to monitor the effect or lack of effect of sterile fly releases), and
- (c) to study the Darien region of Panama as a permanent barrier zone and any special problems that might be encountered in protecting the North American continent from reinfestation by screwworms if they are eradicated from Central America.



O. H. Graham
Research Entomologist

Attachments

cc: E. A. Taylor, SEA, Weslaco
E. L. Kendrick, SEA, New Orleans
R. A. Hoffman, SEA, College Station
D. A. Lindquist, SEA, Beltsville
H. D. Petersen, SEA, College Station
J. E. Novy, APHIS, Mission
N. L. Meyers, APHIS, Washington, D. C.
M. E. Meadows, APHIS, Mexico City
R. E. Reichard, APHIS, Mexico City
D. L. Williams, COPFA, Panama
F. E. Smith, APHIS, Hyattsville
H. C. Hofmann, APHIS, Mexico City
L. E. Wendel, APHIS, Mission
R. S. Sharman, Vet. Med., Auburn
A. A. Arce, Interam. Dev. Bk., Washington, D. C.
J. H. Wyss, APHIS, Miami
~~J. P. Spencer, SEA, Tuxtla Gutierrez~~
J. W. Mackley, SEA, Tuxtla Gutierrez
C. J. Whitten, SEA, Mission

ANNEX A

Members of Team Requested by IICA to Study the Technical Feasibility
of Eradicating Screwworms from Central America.

Dr. Robert S. Sharman, Team Leader
School of Veterinary Medicine, Auburn University
and Member of the Joint Commission, Mexico-American
Screwworm Eradication Program
Retired Director of Animal Health Division, USDA,
SEA
Auburn, Alabama 36830

Dr. Abraham A. Arce
Animal Health Project Specialist
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Dr. O. H. Graham
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Dr. James E. Novy
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Dr. Donald L. Williams
Co-Director, COPFA
USDA, APHIS, VS
Panama, R. P.

Livestock Census for Central America^{1/}

Country	Class of Livestock				
	Bovines	Equines	Sheep	Goats	Swine
Belize	48,000	-	-	-	-
Guatemala	1,712,851	165,174	667,766	53,576	639,031
El Salvador	960,774	104,674	112	-	11,160
Honduras	1,685,487	264,753	2,863	16,938	511,124
Nicaragua	2,864,198	149,446	-	-	207,059
Costa Rica	1,346,222	106,576	-	-	246,802
Panama	1,358,360	130,019	-	-	179,000

ANNEX C

Land Area of Central America with Mexico Included for Comparison

<u>Country</u>	<u>Area in Square Kilometers</u>
Belize	22,965
Guatemala	108,889
El Salvador	21,041
Honduras	112,088
Nicaragua	130,000
Costa Rica	50,700
Panama	<u>75,650</u>
	521,333
Mexico	1,967,183

Dr. Coppedge

UNITED STATES DEPARTMENT OF AGRICULTURE
SCIENCE AND EDUCATION ADMINISTRATION

AGRICULTURAL RESEARCH
SOUTHERN REGION
Screwworm Research
P. O. Box 986
Mission, Texas 78572

September 22, 1980

Subject: Objectives for Screwworm Research

To: Maurice H. Frere
Assistant to Regional Administrator
Program Planning & Review
USDA, SEA, SR
Office of the Regional Administrator
701 Loyola Ave.
P. O. Box 53326
New Orleans, La. 70153

Through: E. A. Taylor
Area Director
USDA, SEA, SR
P. O. Box 267
Weslaco, Tx. 78596

The subject research plans you requested are given below. For brevity, I have combined some research objectives and left out a few minor ones from a more detailed plan prepared following a recent meeting of SEA researchers, APHIS Methods Development personnel and Comision Methods Development personnel. A 5-year plan for screwworm research is currently being developed which will include research objectives, anticipated needs for personnel, mode slots, funding and facilities. This plan should be available in the next 2-3 weeks.

Short Term Objectives (1-2 years)

- A. Investigate the field effectiveness of a narrow genetic base strain of screwworms (in cooperation with University of Texas researchers).
- B. Develop males only strain and conduct initial field evaluations.
- C. Determine reasons for reduced effectiveness of swormlure baited traps in southern Mexico.
- D. Investigate the effectiveness of SWASS in southern Mexico.
- E. Select and evaluate new insecticides for use in SWASS.
- F. Investigate the seasonal incidence of screwworms in the areas of Mexico from Veracruz to Tuxtla and from Mazatlan to Tuxtla.

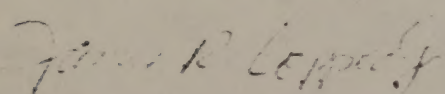
- G. Isolate screwworm feeding and/or oviposition attractant(s).
- H. Investigate seasonal incidence and genetic and isozyme patterns of screwworms in Costa Rica.
- I. Investigate accuracy of native male identification techniques and sperm identification techniques.
- J. Determine the effectiveness of SWASS bait stations against native screwworms.
- K. Investigate seasonal incidence and genetic and isozyme patterns of screwworms in the Tobasco and the Yucatan area of Mexico.
- L. Investigate the inheritibility of fly size and study the effects of size on field effectiveness.
- M. Isolate screwworm attractants from other screwworms, animal dung and certain flowers.
- N. Investigate population dynamics of screwworms in tropical Mexico with emphasis on natural mortality factors.
- O. Continue to select new screwworm strains for mass rearing and assist APHIS with field evaluations of new strains.

Long Term Objectives (5 years)

- A. Study the population dynamics, genetic patterns and isozyme patterns of screwworms in southern Mexico and parts of Central America.
- B. Develop a long lasting formulation of SWASS.
- C. Develop and field test an "artificial wound" as a technique for obtaining screwworm egg masses in the field.
- D. Develop effective and long lasting traps for use in Mexico.
- E. Determine the most effective and economical way to use SWASS in southern Mexico and Central America.
- F. Develop bait systems to the point where they are ready for operational use by APHIS.
- G. Determine if assortive mating occurs and if so its effects on the eradication program.
- H. Evaluate the field effectiveness of an all male strain of screwworms.
- I. Develop quality control standards for screwworm diets.
- J. Provide research support in APHIS's investigations of the free release of sterile flies (chilled fly releases).

These plans have been prepared with the realization that from time to time we may have to redirect our research efforts in order to respond to unforeseen problems in the eradication program.

If I can be of any further assistance, please let me know.


James R. Coppedge
Research/Location Leader

cc: Don Weidhaas, NPS, Beltsville

